

YEAR 2000 WORKING AND ANSWERS

SECTION A

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|----|-------------|-----------|---------|------|------|-----|------|-----|----|------|------|--|------|------|--|------|--|--|-----|--|--|------|--|--|------|--|--|--|--|
| <p>1</p> $= \frac{23}{4} \div \frac{5}{3}$ $= \frac{23}{4} \times \frac{3}{5}$ $= \frac{69}{20}$ $= 3\frac{9}{20}$ | <p>2</p> $2km = 5dm$ $1km = \frac{5dm}{2km}$ $= \frac{5dm}{(2 \times 10,000)dm}$ $= \frac{5}{20,000}$ $= \frac{1}{4000}$ | <p>3</p> <p>LCD = 12</p> $12\left(\frac{2x}{3}\right) - 12\left(\frac{3x}{4}\right) = (1 \times 12)$ $4(2x) - 3(3x) = 12$ $8x - 9x = 12$ $-x = 12$ $\frac{-1x}{-1} = \frac{12}{-1}$ $x = -12$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>4</p> $= b \times b + 4 \times b + a$ $= 4 \times 4 + 4 \times 4 + 2$ $= 16 - 16 + 2$ $= 2$ | <p>5</p> $S = \sqrt[3]{125cm^3}$ $= 5cm$ $TSA = 6 \times S \times S$ $= 6 \times 5cm \times 5cm$ $= 150cm^2$ | <p>6</p> <table border="1" style="margin: 0 auto; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">5</td> <td style="padding: 2px 5px;">3</td> <td style="padding: 2px 5px;">6</td> <td style="padding: 2px 5px;">8</td> <td style="padding: 2px 5px;">x</td> </tr> <tr> <td style="padding: 2px 5px;">26</td> <td style="padding: 2px 5px;">10</td> <td style="padding: 2px 5px;">y</td> <td style="padding: 2px 5px;">65</td> <td style="padding: 2px 5px;">17</td> </tr> </table> $x^2 + 1 = yx^2 + 1 = y$ $6 \times 6 + 1 = yx^2 + 1 = 17$ $36 + 1 = yx^2 = 17 - 1$ $37 = y\sqrt{x^2} = \sqrt{16}$ $x = 4$ | 5 | 3 | 6 | 8 | x | 26 | 10 | y | 65 | 17 | | | | | | | | | | | | | | | | | | | | |
| 5 | 3 | 6 | 8 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | 10 | y | 65 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>7</p> $S = D \div T$ $= 140km \div \frac{105}{60} hr$ $= 140km \times \frac{60}{105} hr$ $= 80km/hr$ | <p>8</p> $x = 180^\circ - 60^\circ (\text{straight line})$ $= 120^\circ$ $y = 60^\circ + 70^\circ$ $= 130^\circ$ | <p>9</p> <p>James : Robert : Amos</p> <p style="text-align: center;">4 : 3 : 9</p> <p>Amos - Robert = 3,000</p> $9s - 3s = 3,000$ $6s = 3,000Frw$ $\frac{6s}{6} = \frac{3,000Frw}{6}$ $s = 500Frw$ <p>Amos = 500 \times 9 = 4,500Frw</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>10</p> $\%P \times CP = P$ $\frac{20}{100} \times CP = 800$ $CP = \frac{800 \times 100}{20} = 4,000Frw$ $SP = CP + P$ $= 4,000Frw + 800Frw$ $= 4,800Frw$ | <p>11</p> $= m \times p + 5 \times n - 4 \times p$ $= 10 \times 3 + 5 \times 2 - 4 \times 3$ $= 30 + 10 - 12$ $= 40 - 12$ $= 28$ | <p>12</p> <p>Width = w, Length = 3w</p> $3w \times w = 48cm^2$ $3w^2 = 48cm^2$ $\frac{3w^2}{3} = \frac{48cm^2}{3} = 2(12 + 4)$ $w^2 = 16cm^2 = 2 \times 16cm$ $\sqrt{w^2} = \sqrt{16cm^2} = 32cm$ $w = 4cm$ $l = (4 \times 3) = 12cm$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>13</p> <p>Note: ($m^3 = st$) therefore no need of changing any unit</p> $= \left(\frac{1}{4} + \frac{3}{4} + \frac{1}{5} + 12\right) \div \frac{1}{5} LCD = 20$ $= \left(\frac{5 + 15 + 4 + 240}{20}\right) \div \frac{1}{5}$ $= \frac{264}{20} \times \frac{5}{1}$ $= 66st$ | <p>14</p> <p>%Boys = x%</p> <p>%Girls = (x + 20)%</p> $2x + 20\% = 100\%$ $2x = 100\% - 20\%$ $\frac{2x}{2} = \frac{80\%}{2}$ $x = 40\%$ $Total\ no = \frac{32 \times 100}{40} = 80\ pupils$ $Girls = Tot - Boys$ $= 80 - 32$ $= 48\ girls$ | <p>15</p> <p style="text-align: center;"><u>Increase</u></p> $= 100\% + 10\%$ $= \frac{110}{100} \times 100kg$ $= 110kg$ <p style="text-align: center;"><u>Decrease</u></p> $= 100\% - 10\%$ $= \frac{90}{100} \times 110kg$ $= 99kg$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>16</p> <p>Divide by 60 twice then by 24 once</p> <table style="margin: 0 auto; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">3257</td> <td style="padding: 2px 5px;">54</td> <td style="padding: 2px 5px;">2d</td> </tr> <tr> <td style="padding: 2px 5px;">60 195425</td> <td style="padding: 2px 5px;">60 3257</td> <td style="padding: 2px 5px;">24 54</td> </tr> <tr> <td style="padding: 2px 5px;">-180</td> <td style="padding: 2px 5px;">-300</td> <td style="padding: 2px 5px;">-48</td> </tr> <tr> <td style="padding: 2px 5px;">0154</td> <td style="padding: 2px 5px;">257</td> <td style="padding: 2px 5px;">6h</td> </tr> <tr> <td style="padding: 2px 5px;">-120</td> <td style="padding: 2px 5px;">-240</td> <td></td> </tr> <tr> <td style="padding: 2px 5px;">0342</td> <td style="padding: 2px 5px;">017m</td> <td></td> </tr> <tr> <td style="padding: 2px 5px;">-300</td> <td></td> <td></td> </tr> <tr> <td style="padding: 2px 5px;">425</td> <td></td> <td></td> </tr> <tr> <td style="padding: 2px 5px;">-420</td> <td></td> <td></td> </tr> <tr> <td style="padding: 2px 5px;">005s</td> <td></td> <td></td> </tr> </table> $= 2days\ 6hrs\ 17min\ 5sec$ | 3257 | 54 | 2d | 60 195425 | 60 3257 | 24 54 | -180 | -300 | -48 | 0154 | 257 | 6h | -120 | -240 | | 0342 | 017m | | -300 | | | 425 | | | -420 | | | 005s | | | <p>17</p> $1^{st}no = x + 1$ $2^{nd}no = x + 3$ $3^{rd}no = x + 5$ $3x + 9 = 78$ $3x = 78 - 9$ $\frac{3x}{3} = \frac{69}{3}$ $x = 23$ $1^{st}no = 23 + 1 = 24$ $2^{nd}no = 23 + 3 = 26$ $3^{rd}no = 23 + 5 = 28$ | <p>18</p> $A = 84cm^2$ $\frac{h}{2}(a + b) = 84cm^2$ $\frac{h}{2}(8cm + 4cm) = 84cm^2$ $\frac{h}{2} \times 12cm = 84cm^2$ $6h = 84cm^2$ $\frac{6cmh}{6cm} = \frac{84cm^2}{6cm}$ $h = 14cm$ |
| 3257 | 54 | 2d | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 195425 | 60 3257 | 24 54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -180 | -300 | -48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0154 | 257 | 6h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -120 | -240 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0342 | 017m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 425 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -420 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 005s | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| <p>19 $= (3,527 \times 305) - (3,527 \times 35)$ $= 1,075,735 - 123,445$ $= 952,290$</p> | <p>20 $r = 2.7m, R = (2.7 + 2.1) = 4.8m$ $A = \pi R^2 - \pi r^2$ $= (3.14 \times 4.8 \times 4.8) - (3.14 \times 2.7 \times 2.7)$ $= 72.3456m^2 - 22.8906m^2$ $= 49.455m^2$</p> | <p>21 $V = \frac{1}{3}\pi r^2 h$ $= \frac{1}{3} \times 3.14 \times 13 \times 13 \times 18$ $= 3,183.96cm^3$</p> |
| <p>22 <i>Equate the two interest formulars</i> <i>Interest = Interest</i> $\frac{P \times T \times R}{100} = A - P$ $\frac{P \times 3 \times 5}{100} = 21,275 - P$ $\frac{3P}{20} = 21,275 - P$ $3P = 20(21,275 - P)$ $3P = 425,500 - 20P$ $3P + 20P = 425,500$ $\frac{23P}{23} = \frac{425,500}{23}$ $P = 18,500Frw$</p> | <p>23 $D = S \times T$ $= \frac{45}{10} km \times \frac{27}{60} hr$ $= 2.025km$ $4S = 2.025km$ $S = (2.025 \div 4)km$ $= 0.50625km$</p> | <p>24 $A.I = \left(\frac{P \times T \times R}{100} + \frac{P \times T \times R}{100} \right) \div 2$ $= \frac{15,000 \times 1 \times 4}{100} + \frac{25,000 \times 1 \times 4.8}{100}$ $= \frac{600 + 1200}{2}$ $= \frac{1800}{2}$ $= 900Frw$</p> |
| <p>25 $D = 5dm, r = (5 \div 2) = 2.5dm$ $V = (3.825 \times 100) = 382.5dm^3$ $\pi r^2 h = 382.5dm^3$ $h = \frac{382.5dm^3}{\pi r^2}$ $h = \frac{382.5dm^3}{3.14 \times 2.5dm \times 2.5dm}$ $h = 19.5dm$</p> | <p>26 <i>Cultivable area</i> $l = (150m - 2.5m) = 147.5m$ $w = (W - 2.5)m$ $l \times w = 9956.25m^2$ $147.5(W - 2.5) = 9956.25$ $147.5W - 368.75 = 9956.25$ $147.5W = 9956.25 + 368.75$ $\frac{147.5W}{147.5} = \frac{10325}{147.5}$ $W = 70m$ $Area = Tot. area - Cult. area$ $= (L \times W) - 9956.25m^2$ $= (150m \times 70m) - 9956.25m^2$ $= 10500m^2 - 9956.25m^2$ $= 543.75m^2$</p> | <p>27 <i>Distance covered by the 1st boat before the second started moving</i> $D = S \times T$ $= 45km/hr \times (7:20 - 7:00)$ $= 45km/hr \times 20min$ $= 45km/hr \times \frac{20}{60} hr$ $= 15km$ $(10:20 - 7:20) = \frac{15km}{S_2 - 45}$ $3(S_2 - 45) = 15$ $3S_2 - 135 = 15$ $3S_2 = 15 + 135$ $\frac{3S_2}{3} = \frac{150}{3}$ $S_2 = 50km/hr$</p> |
| <p>28 $A = \frac{h}{2}(a + b)$ $= \frac{120m}{2} \times 490m$ $= 60m \times 490m$ $= 29,400m^2$</p> | <p>29 $\pi D = 18.84m$ $D = \frac{18.84m}{3.14}$ $D = 6m, r = (6m \div 2) = 3m$ $\frac{4}{9}\pi r^2 h = (376.8 \div 10)m^3$ $\frac{4}{9} \times 3.14 \times 3 \times 3h = 37.68m^3$ $h = \frac{37.68}{4 \times 3.14}$ $h = 3m$</p> | <p>30 $26g + 18s = 162,000 \dots (i)$ $42g + 36s = 219,000 \dots (ii)$ $42(36g + 18s = 162,000)$ $36(42g + 36s = 219,000)$ $1512g + 756s = 6,804,000$ $1512g + 1296s = 7,884,000$ $1296s - 756s = 7,884,000 - 6,804,000$ $540s = 1,080,000$ $540s = 1,080,000$ $\frac{540}{540} = \frac{1,080,000}{540}$ $s = 2,000Frw$ (<i>Cost of a sheep</i>) $36g + (18 \times 2000) = 162,000$ $36g = 162,000 - 36,000$ $36g = 126,000$ $\frac{36g}{36} = \frac{126,000}{36}$ $g = 3,500Frw$ (<i>Cost of a goat</i>)</p> |

SECTION B

| <p>31 Part (a)</p> $\%Lat = 100\% - (55 + 30 + 20)\%$ $= 100\% - 85\%$ $= 15\%$ $Total = \frac{60,000 \times 100}{15}$ $= 400,000Frw$ <p>Part (b)</p> $Each \% = \frac{400,000}{100} = 4,000F$ $Repair = 4,000 \times 20 = 80,000F$ $Cons = 4,000 \times 30 = 120,000F$ $Other = 4,000 \times 35 = 140,000F$ | <p>32</p> <p style="text-align: center;">First year</p> $I = \frac{4,000,000 \times 1 \times 2}{100} = 80,000F$ $A = 4,000,000 + 80,000 = 4,080,000F$ <p style="text-align: center;">Second year</p> $I = \frac{4,080,000 \times 1 \times 2}{100} = 81,600F$ $A = 4,080,000 + 81,600 = 4,161,600F$ <p style="text-align: center;">Third year</p> $I = \frac{4,161,600 \times 1 \times 2}{100} = 83,232F$ $A = 4,161,600 + 83,232 = 4,244,832F$ <p style="text-align: center;">Fourth year</p> $I = \frac{4,244,832 \times 1 \times 2}{100} = 84,896.64F$ <p>Compound Interest</p> $= 80,000 + 81,600 + 83,232 + 84,896.64$ $= 329,728.64Frw$ <p style="text-align: center;">Part (b)</p> $A = P + C.I$ $= 4,000,000 + 329,728.64$ $= 4,329,728.64Frw$ | <p>33 Part (a)</p> $Ext = x$ $Int = (x + 36)$ $Ext + Int = 180^\circ \text{ (straight line)}$ $2x + 36^\circ = 180^\circ$ $2x = 180^\circ - 36^\circ$ $2x = 144^\circ$ $\frac{2x}{2} = \frac{144^\circ}{2}$ $x = 72^\circ$ $Ext \text{ angle} = 72^\circ$ <p style="text-align: center;">Part (b)</p> $Int = Ext + 36^\circ$ $= 72^\circ + 36^\circ$ $= 108^\circ$ <p style="text-align: center;">Part (c)</p> $n = \frac{360^\circ}{Ext} = \frac{360^\circ}{72^\circ} = 5 \text{ sides}$ $Sum = 180^\circ(n - 2)$ $= 180^\circ(5 - 2)$ $= 180^\circ \times 3$ $= 540^\circ$ <p style="text-align: center;">Part (d)</p> <p>Polygon with 5 sides is a PENTAGON</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|------|-----|---|------|----|---|-----|----|----|---|----|---|---------|-----|-----|------|----|-----|---|----|----|----|---|---|---------|-----|-----|------|----|---|----|---|----|---|-----|---|
| <p>34</p> <p>Distance covered by Peter before Kevin started moving</p> $D = S \times T$ $= 14Km/hr \times (10:40 - 8:40)$ $= 14km/hr \times 2hr$ $= 28km$ <p>Distance between two bodies by 10:40am</p> $D = 148km - 28km = 120km$ <p>Time taken by each body from 10:40am to meet the other.</p> $T = \frac{D}{S_1 + S_2} = \frac{120}{14 + 16} = \frac{120km}{30km/hr}$ $= 4hr$ <p>Time they met</p> $T = 10:40am + 4hr$ $= 14:40$ $= 14:40 - 12:00$ $= 2:40pm$ <p>Part (b)</p> <p>Peter</p> $D = S \times T$ $= 14km/hr \times (2 + 4)hr$ $= 14km/hr \times 6hr$ $= 84km$ <p>Kevin</p> $D = S \times T$ $= 16km/hr \times 4hr$ $= 64km$ | <p>35</p> $c = 70^\circ \text{ (opposite angle)}$ $d = 180^\circ - 120^\circ \text{ (co-interior)}$ $= 60^\circ$ $a = d = 60^\circ \text{ (opposite angles)}$ $b = 180^\circ - (c + d) \text{ straight line}$ $= 180^\circ - (70^\circ + 60^\circ)$ $= 180^\circ - 130^\circ$ $= 50^\circ$ $e = b = 50^\circ \text{ (opposite angles)}$ $f = 180^\circ - b \text{ (co-interior)}$ $= 180^\circ - 50^\circ$ $= 130^\circ$ $g = b = 50^\circ \text{ (corresponding)}$ $h = f = 130^\circ \text{ (opposite angles)}$ | <p>36</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Men</th> <th style="text-align: left;">hrs</th> <th style="text-align: left;">m</th> <th style="text-align: left;">days</th> </tr> </thead> <tbody> <tr> <td>40</td> <td>4</td> <td>160</td> <td>16</td> </tr> <tr> <td>32</td> <td>5</td> <td>80</td> <td>x</td> </tr> </tbody> </table> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Workers</th> <th style="text-align: left;">Job</th> <th style="text-align: left;">hrs</th> <th style="text-align: left;">days</th> </tr> </thead> <tbody> <tr> <td>40</td> <td>160</td> <td>4</td> <td>16</td> </tr> <tr> <td>32</td> <td>80</td> <td>5</td> <td>x</td> </tr> </tbody> </table> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Workers</th> <th style="text-align: left;">Job</th> <th style="text-align: left;">hrs</th> <th style="text-align: left;">days</th> </tr> </thead> <tbody> <tr> <td>40</td> <td>x</td> <td>80</td> <td>x</td> </tr> <tr> <td>32</td> <td>x</td> <td>160</td> <td>x</td> </tr> </tbody> </table> $32 \times 160 \times 5 \times x = 40 \times 80 \times 4 \times 16$ $x = \frac{40 \times 80 \times 4 \times 16}{32 \times 160 \times 5}$ $x = 8 \text{ days}$ | Men | hrs | m | days | 40 | 4 | 160 | 16 | 32 | 5 | 80 | x | Workers | Job | hrs | days | 40 | 160 | 4 | 16 | 32 | 80 | 5 | x | Workers | Job | hrs | days | 40 | x | 80 | x | 32 | x | 160 | x |
| Men | hrs | m | days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 4 | 160 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 5 | 80 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Workers | Job | hrs | days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 160 | 4 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 80 | 5 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Workers | Job | hrs | days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | x | 80 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | x | 160 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>37</p> <p>(a). x-axis $30sq = 60min(1hr), 1sq = (60 \div 30) = 2min$</p> $15sq = 10:00 + (15 \times 2)min = 10:00 + 30min = 10:30am$ <p>(b). x-axis $5sq = (5 \times 2) = 10min$</p> <p>(c). $S = D \times T, = 60km \times 1hr, = 60km/hr$</p> <p>(d). $= 11:00 + (10 \times 2)min = 11:00 + 20min = 10:20am$</p> <p>(e). y-axis $10sq = 20km, 1sq = (20 \div 10) = 2km$</p> $AS = \frac{Total \ distance}{Total \ time \ taken} = \frac{40km + 20km}{40min + 10min + 30min} = \frac{60km}{80min} = 60km \div \frac{80}{60}hr = 60km \times \frac{60}{80} = 45km/hr$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |